ELSEVIER

European Economic Review 42 (1998) 831–844

EUROPEAN ECONOMIC REVIEW

Behavioural Economics

A portrait of the individual investor

Werner F.M. De Bondt

Institute for Empirical Economic Research, University of Zurich, Bluemlisalpstrasse 10, CH-8006 Zurich, Switzerland

Abstract

Behavioral finance models often rely on a concept of noise traders who are prone to judgment and decision-making errors. What do noise traders do? We review prior research and present new survey evidence on the behavior of small individual investors who manage their own equity portfolios. Many people (1) discover naive patterns in past price movements, (2) share popular models of value, (3) are not properly diversified, and (4) trade in suboptimal ways. © 1998 Elsevier Science B.V. All rights reserved.

JEL classification: G11

Keywords: Behavioral finance; Investor decision making; Rationality

1. Introduction

For at least 40 years, psychologists have amassed evidence that 'economic man – is very unlike a real man' (Edwards, 1954, p. 382) and that reason – for now, defined by the principles that underlie expected utility theory, Bayesian learning, and rational expectations – is not an adequate basis for a descriptive theory of decision making. The experimental literature abounds with laboratory settings where central axioms of rationality such as frame invariance, dominance, or transitivity are violated. These violations are systematic, robust, and fundamental, i.e., they require new theory (Tversky and Kahneman, 1986).

In response, behavioral decision theorists have introduced a series of new concepts under the general heading of 'bounded rationality,' a term associated

PII S0014-2921(98)00009-9

with Herbert Simon (1947, 1983). For instance, in the psychology of judgment, the dual notion of 'heuristics' in intuitive decision making (Tversky and Kahneman, 1974) and of 'mental frames' are critical building blocks. We find that decision process influences decision outcome. Also, a problem may be approached and solved from different points of view. Mental frames may be capricious and wrong but, once in place, they are difficult to change. They are usually socially shared and can be manipulated (Ellul, 1965). In the psychology of choice, a major competitor to expected utility theory is prospect theory (Kahneman and Tversky, 1979). The new theory emphasizes the influence on choice of problem editing, reference points, loss aversion, and small probabilities.

Many economists, particularly in finance, are skeptical towards the new behavioral approach and the alleged shortcomings in individual rationality. They ask several good questions: What happens outside the lab, i.e., what is the ecological validity of experiments that demonstrate poor reasoning? How do the different violations of rationality add up in a practical decision context? (For instance, some experiments suggest that people overestimate small probabilities, yet other studies find that small probabilities do not get enough weight in actual choice.) Finally, what is the role of social institutions, in particular, markets? How and in which way does rationality at the societal level transcend individual rationality (Hayek, 1948)?

The purpose of this article is to offer a brief survey of prior research and an illustration of actual decision making in a financial context: How do small individual investors trade stocks and how do they think about their equity holdings? I offer a list of widely acknowledged anomalies in behavior as well as some interpretations.[1] The portrait of investors sketched below is in many ways a 'sorry picture'. What is surprising is the failure of many people to infer basic investment principles from years of experience. The balance of the paper is organized as follows. Section 2 surveys the literature. Section 3 presents selected results from a study of individual investors in the Fox Valley in Wisconsin (U.S.A.). Section 4 concludes.

2. The psychology of investors

It is part of Wall Street folklore that small individual investors are 'dumb'. Indeed, many financial experts use the sentiment of small traders as a contrarian indicator. Behavioral research also paints a negative picture. There are four classes of anomalies. They have to do with (i) investors' perceptions of the stochastic process of asset prices; (ii) investors' perceptions of value; (iii) the

[1] For a matching survey that focuses on the behavior of markets and firms, see De Bondt and Thaler (1995).

management of risk and return; and (iv) trading practices. Below, I briefly review these anomalies.

2.1. Perceptions of price movements

As long as there have been equity markets, investors have tried to spot trends and turning points in stock prices. A classic text is Edwards and Magee (1948). Pring (1991) states that 'the art of technical analysis – is to identify trend changes at an early stage and to maintain an investment posture until the weight of the evidence indicates that the trend has reversed'. Popular methods include moving average rules, trading range break rules, and filter rules. Whether technical analysis can work is debatable. Recent studies of chaos and nonlinear dynamics in asset returns do not exclude the possibility. However, we certainly do know that many investors see patterns where there are none. For instance, Kroll et al. (1988) observe this phenomenon in their experimental tests of the mean-variance portfolio model. Gilovich (1991) reviews some of the psychological evidence that supports the mental structuring of random sequences, e.g., the hot-hand phenomenon in basketball.

What price patterns do investors detect? Perhaps the best-established stylized fact is extrapolation bias, i.e., the expected continuation of past price changes. People are optimistic in bull markets and pessimistic in bear markets. De Bondt (1993) reports the results from a weekly mail survey of 125 investors conducted by the *American Association of Individual Investors* (AAII) between 1987 and 1992. The survey of randomly selected AAII-members asks for the likely direction of the U.S. stock market during the next six months ('bullish, bearish, or neutral'). The average percentage gap between the fraction of investors that is bullish and the fraction that is bearish increases by 1.3% for every percentage point that the *Dow Jones* rises during the week prior to the survey. Investor sentiment is found to depend on market performance during the last 100 trading days, and possibly much longer. Intuitive time-series extrapolation has been studied by, among others, Andreassen (1988). It figures prominently in theories of noise and positive feedback trading (for a review, see Shleifer and Summers, 1990).[2]

A second set of stylized facts has to do with the intuitive assessment of variability. Investor perceptions of the likely variation in equity returns are too narrow. Subjects are asked to generate price forecasts P_{lo} and P_{hi} so that there is

[2] However, economic experts appear to be contrarians. De Bondt (1991) studies 5400 predictions of the Standard & Poor's Index (S&P) by prominent economists. The Livingston surveys (1952–1986) are the source of the data. After 3 year bull markets, the average forecast is that, over the next half-year, the S&P will decline at an annual rate of 6.4%. (This pessimism is not borne out by reality.) In general, the forecasts are useless for market timing. Yet, there is a definite pattern in what the experts do.

only an $x\%$ chance that the future price will be lower or an $x\%$ chance that the price will be higher. For a large set of forecasts made by well-calibrated subjects, the actual outcomes should fall within the confidence interval $(P_{hi} - P_{lo})$ on $(100 - 2x)\%$ of the predictions. In fact, the evidence overwhelmingly shows that people's subjective probability distributions are too tight, particularly, for difficult tasks like predicting stock prices (Lichtenstein et al., 1982). Tversky and Kahneman (1974) suggest that the overconfidence results from forecasters anchoring too much on their most likely prediction (P_b). De Bondt (1993) finds that there is also a second anchor at work. The second anchor is a price representative of past price levels. As a result, the confidence interval for a time series with rising prices is not symmetric but left skewed, $(P_b - P_{lo}) > (P_h - P_b)$. That is, if a large price increase is predicted, the confidence interval recognizes the possibility of a large decline and, vice versa, if a decrease is predicted.[3] In sum, perceived variability (like expected return) depends on prior performance. It is as if investors predict the near future with an eye toward recent price changes but that past price levels anchor their longer-term forecasts. The results are consistent with the exchange rate surveys studied by Ito (1990). Investors who think long term tend to subscribe to regressive expectations and those who think short term have static expectations.

2.2. *Perceptions of value*

Few individual investors have an adequate understanding or are capable of using the valuation techniques that are recommended in finance textbooks, say, dividend discount models. Perceptions of value depend in large measure on popular models, i.e., mental frames that are socially shared through stories in the news media, conversation, and tips from friends or financial advisors (Shiller, 1990). Many people cannot distinguish good stocks from good companies. Thus, firms that enjoy rapid earnings growth or that in some other way are glamorous enough to appear on the cover of major business magazines are seen as excellent investments. In contrast, companies that report losses or lose market share seem inherently unattractive. Shefrin and Statman (1997) analyze the annual surveys of firm reputation published by *Fortune Magazine*. They find that, in the cross section, reputation is inversely correlated with the ratio of book value to market value of equity, a statistic that is known to predict returns. In other words, on average, highly reputed companies seem overpriced since they become poor stock market performers afterwards. Conversely, companies that look bad in the court of public opinion are bargains from an investment standpoint.

[3] Peter Lynch (1990) also emphasizes skewness in risk perceptions. He refers to 'if it's gone this high already, how can it possibly go higher' ? and 'if it's gone down this much, it cannot go much lower' as two of 'the 12 silliest (and most dangerous) things people say about stock prices'.

The underlying problem is that too many people are short-term oriented and 'judge a book by its cover'. Unusual runs in abnormal earnings growth, up or down, must eventually come to an end and may be partially reversed. The mental picture that motivates trading, however, often does not include the long view. De Bondt and Thaler (1985) use past stock returns as a proxy for excessive investor optimism or pessimism. They report systematic price reversals. The evidence contradicts Bayesian decision making and supports stock market overreaction – more or less in the same way that voters approve or disapprove of politicians depending on the current state of the economy, or that other social fashions change. The consequences of judgment by representativeness may also be seen in the inferior long-run performance of initial public offerings (Ritter, 1991). The data agree with the notion that 'many firms go public near the peak of industry-specific fads'.

Once in place, popular models resist change. Bernard (1993) summarizes the evidence on the post-earnings-announcement drift in stock returns. The market is slow to respond to earning surprises and it discounts the news, particularly at turning points. Around later announcements, prices react as if the market naively believes that earnings should mirror what they were for the corresponding quarter from the previous year. There is also a growing literature on herding and social pressure concluding that investors put more confidence in what is familiar and comfortable.[4] For example, many people own residential real estate near their workplace, they keep large equity holdings in local firms (Huberman, 1997), and their portfolios lack international diversification (French and Poterba, 1991). It seems likely that conformist behavior affects asset prices. Notions of prudence, fiduciary duty, and accountability rely on external validation, i.e., the requirement that people be able to justify their conduct (Tetlock, 1991). Teh and De Bondt (1997) find that U.S. equity returns depend on shareholder trading practices and owner identity. In the cross-section of companies, conventional stocks that many people like to trade earn lower returns.

2.3. *Managing risk and return*

An important lesson of modern portfolio theory is that 'diversification pays', i.e., properly diversified investors can earn higher returns without having to face the danger of higher risk. Yet, many households are underdiversified. The very

[4] In experiments, unfamiliar gambles appear riskier than familiar gambles – even if the gambles are objectively identical (Tversky and Heath, 1991). It could be that subjects judge themselves more competent to handle everyday decisions, or that familiar choices cause less regret if they fail. Whatever the exact cause, there is consensus that underdiversification often results from investor choice rather than from institutional factors (e.g., transaction costs).

idea that risk is defined at the level of the portfolio – rather than at the level of individual assets – and that risk depends on covariation between returns remains foreign to many investors. However, it is widely believed that risk can still be managed by knowledge and trading skill after funds have been committed. This encourages investors to put wealth in few assets. People often imagine, for instance, that their equity exposure is limited because in a bear market they will have the presence of mind to sell quickly. Thus, a false belief in universal liquidity builds an illusion of control (Langer, 1975). Risk is also avoided in other ways, e.g., by decision delay or delegation of authority. For these reasons, in surveys and interviews, the respondents often claim that they 'take calculated risks' but that they 'do not gamble' (March and Shapira, 1987). Risk is seen as controllable, e.g., with hedging techniques. Bad outcomes, therefore, suggest bad decision making.

The evidence that attitudes toward risk are a stable personality trait, consistently applied across risk-taking tasks, remains largely elusive (Slovic, 1972). It is an old puzzle of utility theory why some investors buy insurance as well as lottery tickets. Risk taking also varies with changing fortune, e.g., in the neighborhood of bankruptcy (March and Shapira, 1992).

Nevertheless, there are several stylized facts relating to people's portfolio choices – other than underdiversification – that point to systematic, if poorly understood, risk attitudes. For example, most households keep a hefty portion of their financial wealth in riskless assets even though equity shares offer more impressive long-run returns. In 1992, only 28% of U.S. households held publicly traded stocks or shares in stock mutual funds.[5] Prospect theory may help to explain the puzzle. Benartzi and Thaler (1995) accept that, when investors are confronted with price volatility, they act myopically. People shy away from owning shares because, at least on paper, they suffer frequent short-term losses, no matter how well stocks perform over long periods. This anxiety accounts for the surprising magnitude of the equity premium. Other puzzles of portfolio behavior pertain to popular financial advice. It is commonly believed that (i) 'aggressive investors' ought to hold a higher ratio of stocks to bonds than 'conservative investors' (Canner et al., 1997), and that (ii) time horizon should influence portfolio composition (Samuelson, 1989).[6] Neither behavior is consistent with standard finance models.

The anomalies that we have listed call for a new behavioral theory of portfolio choice. Shefrin and Statman (1994) propose a 'pyramid model', with multiple

[5] We observe the same phenomenon in Europe. For instance, based on Swedish data, Agell and Edin (1990) find that 19% of households own common stock. In contrast, 75% have checking or savings accounts.

[6] A widely cited rule-of-thumb is that the stock portion of the portfolio should equal, in percent, 100 minus the investor's age.

layers of investments that are kept strictly segmented. The bottom layers (cash, bank certificates of deposit, savings accounts, etc.) are designed to guarantee financial survival. The upper layers (bonds, stocks, options, etc.) offer investors upside potential but also expose them to return volatility. Risk is managed by constructing a pyramid that meets the investors' objectives. However, covariation between asset categories and individual securities is mostly ignored.

2.4. *Trading practices*

Many investors have a psychological disposition to realize gains on past winner stocks early and an aversion to realize losses. Yet, such behavior is generally inappropriate, e.g., for tax reasons (Shefrin and Statman, 1985). Traders use a variety of rules and precommitment techniques to control emotion, e.g., stop-loss orders. It seems an inevitable theme of popular investment guides that people should try 'to take an objective stance', 'to master their emotions', and 'to avoid beating themselves'. It is also frequently stated that an investment plan's principal function is 'discipline'.

Discipline is difficult to maintain. For instance, many individuals trade shares on impulse or on random tips from acquaintances, without prior planning. One reason is that people are unjustifiably optimistic about almost everything that concerns their personal life.[7] Another problem, mentioned earlier, is that trader sentiment trails the market. As a result, investors are inclined to buy shares in bull markets and to sell shares in bear markets. A trading rule such as dollar-cost averaging may be suboptimal but it guarantees that people pay no more than the average price for the shares that they buy. Research finds that even experts – who base their decisions on accurate models and good judgments of complex stimuli – are often unable to consistently apply what they know (Slovic, 1972).

Finally, reference points play a major role in trading behavior. They are performance benchmarks. Many investors are contented, even in bear markets, if they manage to keep up with the return earned by the market index. The original purchase price is a second, highly salient reference point. How many people can bring themselves to sell off a house at a price that is lower than what they paid for it? In equity markets too, trading volume falls when prices are down.

---

[7] Subjective probability estimates are influenced by wishful thinking, i.e., the degree to which an outcome is viewed as desirable or undesirable. For instance, Weinstein (1980) reports that college students think themselves to be 42% more likely than their peers to earn a good starting salary after graduation, and 38% less likely to have a heart attack before the age of 40.

3. The Fox Valley Investors

I now illustrate the previous discussion with selected results from a study of 45 individual investors in the Fox Valley in Wisconsin (U.S.A.).[8] The investors were recruited at a conference organized by the *National Association of Investment Clubs* in Appleton. Every investor personally managed an equity portfolio (i.e., they did not invest in stock mutual funds). The subjects agreed to make repeated weekly forecasts of the *Dow Jones Industrial Average* (DJIA) and of the share prices of one of their main equity holdings. The investors also responded to other survey questions, relating to trading behavior, perceptions of value, familiarity with finance theories, and so on. The research took place between October 1994 and March 1995. During this period, the U.S. stock market was in a modest uptrend, rising at about 1% per month.

The average subject in the study was 58 years old and had 18 years of experience as an equity investor. There were 30 men and 15 women. The mean value of their financial portfolio was $310 000 (excluding real estate), with 72% of the portfolio invested in stocks.[9] The average subject spent seven hours per week 'thinking about [their] investments', and read various financial newspapers or magazines. Only five people in the group stated that they 'never' watched *Wall Street Week* (with Louis Rukeyser), a popular T.V. program broadcast every Friday night.

Each weekend, for a sequence of 20 weeks, the subjects were asked to provide, 'to the best of their ability', point forecasts of the closing level of the DJIA for the fridays that followed two and four weeks later. They also produced interval estimates, i.e., price levels for which they believed that there was only a *one-in-ten* chance that the *Dow Jones* would turn out higher, and only *a one-in-ten* chance that the *Dow Jones* would turn out lower. The subjects further answered identical questions for one of their main equity holdings. The set of companies chosen by subjects included IBM, Merck, McDonald's, and 25 other large companies, with few exceptions, all publicly traded on the *New York Stock Exchange*.

The subjects used specially printed postcards to mail their predictions from home or wherever they happened to be at the time.[10] Most enjoyed their participation in the study. As an added incentive, the individual with the smallest sum of squared percent forecast errors for point forecasts (in total, forty

[8] For a complete description, see De Bondt (1997).

[9] The smallest portfolio was $25 000; the largest, $1 025 000. The minimum fraction of the portfolio invested in equity securities was 20%; the maximum, 100%. The percent invested in fixed-income securities is systematically higher for older and more experienced investors.

[10] If a postcard was delayed, the subject was contacted by phone. Our statistical analysis assumes that investors had full price information up to the date that the postcard was mailed.

Table 1
Actual and perceived return distributions

Statistical parameters	Actual	Perceived
A: Forecasts of company prices		
Return: 2 weeks	0.65%	1.29%
Return: 4 Weeks	1.79%	2.41%
Excess return: 2 weeks	0.28%	0.86%
Excess return: 4 weeks	0.72%	1.59%
Confidence interval: 2 weeks	10.26%	8.54%
Confidence interval: 4 weeks	15.13%	9.14%
Upper confidence interval: 2 weeks	50.00%	43.00%
Upper confidence interval: 4 weeks	52.00%	42.00%
Beta: 2 weeks	0.87	0.54
Beta: 4 weeks	0.86	0.60
B: Forecasts of the Dow Jones Industrial average		
Return: 2 weeks	0.36%	0.43%
Return: 4 weeks	1.08%	0.83%
Confidence interval: 2 weeks	4.71%	4.11%
Confidence interval: 4 weeks	7.25%	4.29%

All statistics are averages across forecast dates and across subjects. Actual and perceived parameters are calculated in identical ways. The returns and excess returns are for two and four weeks. They are computed on the basis of the price levels for the dates that the subjects mailed their forecasts. Excess returns are company returns minus market returns. Confidence intervals are defined as the difference between the high forecast and the low forecast, divided by the price level at the day of the forecast and multiplied by 100. The upper confidence interval is the fraction of the confidence interval that exceeds the point forecast. Beta is based on an bivariate regression, for each subject, of forecasted company returns on forecasted market returns.

predictions) won dinner for two at a fancy local restaurant. One more participant won the same prize based on a lottery.

3.1. Forecasts of risk and return

Table 1 summarizes the results. The parameters that are listed are averages across forecast dates and across subjects. To save space, I omit statistical tests. However, the results that I discuss are statistically significant and they pass the usual tests appropriate for a panel data set.

There are four major findings. First, the Fox Valley investors are overoptimistic about the likely performance of the shares that they own but not about the performance of the *Dow Jones*. The average predicted two-week return for individual companies, over and above the return predicted for the DJIA, is 0.86% (see panel A). Yet, the actual performance of the portfolio of stocks held collectively by investors is quite close to the performance of the DJIA, e.g., the

difference for two-week periods is only 0.28%. The predicted two-week (four-week) returns are on average 0.64% (0.62%) too high.[11] In contrast, the actual and predicted returns for the DJIA are statistically indistinguishable (see Panel B). Second, the perceived confidence intervals ($P_{hi} - P_{lo}$) – divided by the price level on the forecast date – are always too narrow relative to the actual variability in prices. Roughly, twice as many observations fall outside the 10% limits as expected, if the subjects are well calibrated. As in previous research, the problem is more severe for longer term forecasts. Third, the confidence intervals are asymmetric. The upper confidence interval is the fraction of ($P_{hi} - P_{lo}$) that exceeds the point forecast. Since a majority of the point forecasts in the sample is 'up', the average subject imagines more downward than upward return variability (De Bondt, 1993). Simple bivariate regressions show that predicted return and predicted skewness are inversely linked. Fourth, investors underestimate the covariation in returns between their portfolio holdings and the market index. The perceived betas, based on regressions of forecasted company returns on forecasted index returns, are about two-thirds of the level of the actual betas. In the cross section of companies, there is *no* relationship between actual and perceived betas. Evidently, this observation weakens the theory that investors use betas, or other measures of covariation, to construct optimal portfolios.

3.2. Beliefs about risk and return

The Fox Valley investors also responded to numerous survey questions that are relevant to the manner in which an equity portfolio 'should' be managed. The questions were formulated to be of interest to finance theorists. The subjects read a series of brief statements. They registered on a five-point scale whether they strongly disagreed (−2), disagreed (−1), were neutral (0), agreed (1), or strongly agreed (2).

Table 2 lists selected questions, average scores, and corresponding *t*-statistics. I also report the percent of subjects who agree or strongly agree with the statement. It appears from questions 1 and 2 that the Fox Valley investors, in large majority, think that a solid understanding of just a small number of firms may be a more effective risk management tool than diversification. The investors certainly do not believe in 'throwing darts' or that the stock market is a fair game (question 3). Most subjects even deny a positive trade-off between risk and return (question 4). They also reject notions of risk that rely upon the covariability of returns with the market index (question 5). Although lack of space does

[11] The null hypothesis that the difference between actual and predicted returns is zero is rejected in both cases. The *t*-statistics are, respectively, 3.1 and 2.3.

Table 2
Investor beliefs about risk and return

Question	% Agree	Score	*t*-stat.
1. 'I would rather have in my stock portfolio just a few companies that I know well than many companies that I know little about'.	89	1.43	10.0
2. 'If you do not do your homework (e.g., follow the financial news, learn about the company, etc.) I doubt that you will achieve much investment success'.	70	0.92	5.3
3. 'Investing in stocks is like buying lottery tickets. Luck is everything and investment skill plays no meaningful role'.	0	− 1.62	− 20.1
4. 'Because most investors do not like risk, risky stocks sell at lower market prices'.	7	− 0.89	− 5.8
5. 'The risk of a stock depends on whether its price typically moves with or against the market'.	18	− 0.57	− 3.2

Forty-five subjects register on a five-point scale whether they strongly disagree (score = − 2), disagree (− 1), are neutral (0), agree (1), or strongly agree (2) with five statements. I list the questions, the percent of subjects who agree or strongly agree, average scores, and *t*-statistics that test whether the average score equals zero.

not allow a complete discussion, it deserves emphasis that the survey findings are robust to changes in wording, sequencing of the statements, etc.

4. Implications

Why does it matter if small individual investors do not behave as we think that they should? There are two reasons. The first is that substandard financial management directly affects people's well being. In many countries, the family, the corporate sector and the state play a reduced role in protecting people from the hazards of life (sickness, unemployment, old age). For example, in the United States, the shift from defined benefit to defined contribution plans to secure retirement income has transfered much responsibility to individual people. It will be interesting to see whether the current enthusiasm for this shift can survive a bear market. In any event, the ongoing changes have already greatly increased the demand for investment advice, as is evidenced by the spectacular growth of the financial planning industry.

The second reason is that investor behavior likely affects what happens in markets. With costly arbitrage, psychological factors become relevant and it

would be unsound to model market behavior based on the assumption of common knowledge of rationality.[12] As stated by Graham and Dodd, ' – the (stock) market is not a weighing machine, on which the value of each issue is recorded by an exact and impersonal mechanism – Rather – the market is a voting machine, whereon countless individuals register choices which are the product partly of reason and partly of emotion' (1934, p. 23). Hopefully, future research will throw more light on the inner workings of the 'voting machine' and make clear how market and individual decision making anomalies are linked.

Acknowledgements

I thank Menno Brouwer, Pey-Ning Huang, Eleanor Marquardt, John Riedl, and Leon Straub for their assistance, and seminar participants at the University of Manchester for comments. This research was financially supported by the Frank Graner Professorship in Investment Management at the University of Wisconsin-Madison. I am also grateful to the many Fox Valley investors who contributed to this study.

References

Agell, J., Edin, P.A., 1990. Marginal taxes and the asset portfolios of Swedish households. Scandinavian Journal of Economics 92, 47–67.

Andreassen, P.B., 1988. Explaining the price–volume relationship: The difference between price changes and changing prices. Organizational Behavior and Human Decision Processes 41, 371–389.

Benartzi, S., Thaler, R.H., 1995. Myopic loss aversion and the equity premium puzzle. Quarterly Journal of Economics 110, 75–92.

Bernard, V.L., 1993. Stock price reactions to earnings announcements: A summary of recent anomalous evidence and possible explanations. In: Thaler, R.H. (Ed.), Advances in Behavioral Finance. Russell Sage Foundation, New York.

Canner, N., Mankiw, N.G., Weil, D.N., 1997. An asset allocation puzzle. American Economic Review 87 (1), 181–191.

De Bondt, W.F.M., 1991. What do economists know about the stock market? Journal of Portfolio Management 18, 84–91.

De Bondt, W.F.M., 1993. Betting on trends: Intuitive forecasts of financial risk and return. International Journal of Forecasting 9, 355–371.

De Bondt, W.F.M., 1997. The Fox Valley investors and the psychology of risk. Working paper. University of Wisconsin, Madison.

De Bondt, W.F.M., Thaler, R.H., 1985. Does the stock market overreact? Journal of Finance 40, 793–808.

[12] How much rationality we can count on is difficult to say. See Nagel (1997) for an interesting discussion. Of course, this difficulty may be an opportunity for sophisticated investors.

De Bondt, W.F.M., Thaler, R.H., 1995. Financial decision making in markets and firms: A behavioral perspective. In: Jarrow, R.A. et al. (Ed.), Handbook of Finance. Elsevier, Amsterdam.

Edwards, R.D., Magee, J., 1948. Technical Analysis of Stock Trends. John Magee, Springfield, MA.

Edwards, W., 1954. The theory of decision-making. Psychological Bulletin 41, 380–417.

Ellul, J., 1965. Propaganda: The Formation of Men's Attitudes. Alfred A. Knopf, New York.

French, K.R., Poterba, J.M., 1991. Investor diversification and international equity markets. American Economic Review 81, 222–226.

Gilovich, T., 1991. How We Know What Isn't So. The Fallibility of Human Reason in Everyday Life. The Free Press, New York.

Graham, B., Dodd, D., 1934. Security Analysis. McGraw-Hill, New York.

Hayek, F.A., 1948. Individualism and Economic Order. University of Chicago Press, Chicago.

Huberman, G., 1997. Familiarity breeds investment. Working paper. Columbia University, New York.

Ito, T., 1990. Foreign exchange rate expectations: Micro survey data. American Economic Review. 80, 434–449.

Kahneman, D., Tversky, A., 1979. Prospect theory: An analysis of decision under risk. Econometrica 47, 263–291.

Kroll, Y., Levy, H., Rapoport, A., 1988. Experimental tests of the mean–variance model for portfolio selection. Organizational Behavior and Human Decision Processes 42, 388–410.

Langer, E.J., 1975. The illusion of control. Journal of Personality and Social Psychology 32, 311–328.

Lichtenstein, S., Fischhoff, B., Phillips, L.D., 1982. Calibration of probabilities: The state of the art to 1980. In: Kahneman, D. et al. (Eds.), Judgment Under Uncertainty: Heuristics and Biases. Cambridge University Press, New York.

Lynch, P., 1990. One Up On Wall Street. Penguin Books, New York.

March, J.G., Shapira, Z., 1987. Managerial perpectives on risk and risk taking. Management Science 33, 1404–1418.

March, J.G., Shapira, Z., 1992. Variable risk preferences and the focus of attention. Psychological Review 99 (1), 1722–1783.

Nagel, R., 1997. A survey on experimental guessing games: A study of bounded rationality and learning. Working paper. Universitat Pompeu Fabra.

Pring, M.J., 1991. Technical Analysis Explained. 3rd ed., McGraw-Hill, New York.

Ritter, J.R., 1991. The long-run performance of initial public offerings. Journal of Finance 46, 3–27.

Samuelson, P.A., 1989. The judgement of economic science on rational portfolio management: Indexing, timing, and long-horizon effects. Journal of Portfolio Management 16, 4–12.

Shiller, R.J., 1990. Speculative prices and popular models. Journal of Economic Perspectives 4, 55–65.

Shefrin, H., Statman, M., 1985. The disposition to sell winners too early and ride losers too long: Theory and evidence. Journal of Finance 40, 777–790.

Shefrin, H., Statman, M., 1994. Behavioral portfolio theory. Working paper. Leavey School of Business, Santa Clara University, September.

Shefrin, H., Statman, M., 1997. Comparing expectations about stock returns to realized returns. Working paper. Leavey School of Business, Santa Clara University, February.

Shleifer, A., Summers, L.H., 1990. The noise trader approach to finance. Journal of Economic Perspectives 4, 19–33.

Simon, H.A., 1947. Administrative Behavior. 3rd ed., Free Press, New York, 1976.

Simon, H.A., 1983. Reason in Human Affairs. Stanford University Press, Stanford, CA.

Slovic, P., 1972. Psychological study of human judgment: Implications for investment decision making. Journal of Finance 27, 779–799.

Teh, L.L., De Bondt, W.F.M., 1997. Herding behavior and stock returns: An exploratory investigation. Swiss Journal of Economics and Statistics 133, 293–324.

Tetlock, P.E., 1991. An alternative metaphor in the study of judgment and choice: People as politicians. Theory and Psychology 1, 451–475.

Tversky, A., Heath, C., 1991. Preferences and beliefs: Ambiguity and competence in choice under uncertainty. Journal of Risk and Uncertainty 4, 5–28.

Tversky, A., Kahneman, D., 1974. Judgment under uncertainty: Heuristics and biases. Science 185, 1124–1131.

Tversky, A., Kahneman, D., 1986. Rational choice and the framing of decisions. Journal of Business 59, 67–94.

Weinstein, N.D., 1980. Unrealistic optimism about future life events. Journal of Personality and Social Psychology 39, 806–820.